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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/080,884	02/22/2002	Do-Hyung Kim	4591-226	6557

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EXAMINER
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DEO, DUY VU NGUYEN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 05/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/080,884

Applicant(s)

KIM ET AL.

Examiner

DuyVu n Deo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-5,7 and 10-13 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,7 and 10-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some \* c) ☐ None of:
    - 1. ☐ Certified copies of the priority documents have been received.
    - 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    - 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims, 1, 3, 5, 7, 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agahi et al. (US 6,140,208) and Kim et al. (US 6,461,937).

Agahi describes a method for forming shallow trench isolation comprising: a first of etching the substrate to form a trench (col. 4, line 32-35); a second step of depositing an conformal insulating oxide layer on both sidewalls and bottom of the trench (col. 4, line 48-50); a third step of growing a thin thermal oxide layer on sidewalls and bottom of the trench through the insulating oxide layer using a thermal oxide process (this would read claimed third step of growing a thermal oxide between the conformal material layer and the substrate through a thermal oxide process) (col. 4, line 60-col. 5, line 5); a fourth step of forming a nitride liner on the insulating oxide layer (col. 5, line 5-6); a fifth step of filling the trench with isolating material (col. 5, line 8-10). Unlike claimed invention, Agahi doesn't describe the conformal insulating oxide layer is a high temperature oxide (HTO), which is formed at T 800 degrees Celsius. Agahi forms the conformal oxide at 500-600 degrees Celsius. However, using other types of oxide such as claimed HTO, as shown here by Kim (col. 6, line 28-31) in which the HTO is formed at 700-900 degree Celsius, Al<sub>2</sub>O<sub>3</sub>, Ta<sub>2</sub>O<sub>5</sub> would have been obvious to one skilled in the art at the

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time of the invention with a reasonable expectation of success. At this time, there is no unexpected result of using other types of oxide.

Referring to claims 3 and 7, the thickness of the insulating oxide material is 50-300 angstrom and the thickness of the thermal oxide is 50-200 angstrom (col. 4, line 56, 67).

Referring to claim 12, in a second embodiment the thermal oxide is formed and then a forming a conformal insulating oxide layer on the thermal oxide layer (col. 3, line 20-25; col. 5, line 15-18).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Agahi as applied to claim 1 above, and further in view of Jang et al. (US 6,037,018).

Agahi doesn't describe the isolation material is made of HDP or BPSG to a thickness of 3000-10000 angstrom. Jang describes a same method of forming shallow trench isolation where he teaches of the isolation material is made of HDP oxide layer at a thickness between 3000-10000 angstrom (col. 7, line 38-col. 8, line 3). It would have been obvious for one skill in the art to form the isolation material in light of Jang because Jang further describes technique and other specific parameters for forming the isolation layer to fill the trench with a reasonable expectation of success.

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### ***Double Patenting***

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1-9 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-26 of copending Application No. 10/083,756. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both teach a method for forming a shallow trench isolation having a thermal oxide between a conformal liner material and the substrate.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1, 3-5, 7, 10-13 have been considered but are moot in view of the new ground(s) of rejection.

8. Applicant's arguments filed 3/15/04 have been fully considered but they are not persuasive.

Referring to applicant's argument that Agahi doesn't describe the conformal material is formed from oxide such as HTO, Al<sub>2</sub>O<sub>3</sub>, or Ta<sub>2</sub>O<sub>3</sub> is acknowledged. However, at this time it

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would have been obvious to one skilled in the art at the time of the invention to use other types of oxide such as claimed oxide with a reasonable expectation of success. At this time, there is no unexpected result of using other types of oxide.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 703-305-0515.

DVD

5/5/04

